

PHOTOS AND FEATURES OF CHINESE INDUSTRY, No. 65, 1 April 1966

Chin-chou, New Industrial Metropolis Developed
Within ~~With~~ Past Several Years

Chin-chou, a city in Liaoning Province in Northeast China, is currently ^{new} drawing attention as one of China's ~~newly/developed~~ industrial metropolises, which has ~~hastily~~ developed belatedly through the exertion of self-effort. Since 1958, for example, Chin-chou has constructed 47 new industrial enterprises covering eight fields ^{including} vacuum metallurgy ^{equipment} facilities, quartz glass, rare earth metals, semi-conductors, measuring instruments, and synthetic fibers. Although all of these enterprises are small plants with their smallest plant employ~~ing~~ing several tens of employees and their largest plant employ~~ing~~ing less than 500 employees, and their equipment are practically all self-manufactured or self-modified "native equipment", they are currently producing 141 types of products and several hundred products in accordance with specifications. The majority of these ~~new~~ products are new products that China was incapable of producing several years ago, and the quality ^{processes} and production/~~processes~~ employed are "top level" within China. Moreover, additional new products are reportedly being trial manufactured at the present time.

Prior to 1958, Chin-chou merely comprised of 25 repair ~~shop~~ plants and small agricultural accessory product processing plants. From the fact that it had constructed new industrial enterprises one after another, which are fairly up to date by world standards, within the past several years, it is probably worth noting that the~~se~~ industrial construction methods employed were typical of Chinese self-effort. The current status and the construction methods employed by the various newly developed industries in Chin-chou are as follows:

Manufacture of Vacuum Metallurgy Facilities Equipment

Vacuum metallurgy is an advanced metallurgy technique. ~~throughout the~~ refined ~~metals~~ The highly/purified metals and the high grade alloys smelted by equipment are vacuum metallurgy ~~facilities/equipment~~ raw materials essential to the aircraft, electronic and chemical industries. The Chin-chou Electric Furnace Plant is currently manufacturing the latest models in vacuum metallurgy equipment. When this plant was assigned the task of manufacturing vacuum metallurgy equipment, it did not possess the equipment or the experience to implement this assignment but, relying on their own efforts and abilities, the workers of this plant devised the means to manufacture the required equipment. In early 1961, they successfully manufactured their first induction vacuum ~~induced~~/electric furnace and, in late 1961, they also manufactured the vacuum self-exhausting electrode arc furnace. The vacuum induction electric furnace is capable of smelting a higher quality special refined steel than the ordinary induction electric furnace. A major portion of the huge volume of stainless steel used in the equipment for manufacturing chemical fertilizers in China during the past several years were refined in vacuum induction electric furnaces manufactured by China through her own efforts. The vacuum self-exhausting electrode arc furnace is used to smelt metals having high melting points beyond the range of the vacuum induction electric furnace such as molybdenum and titanium. Product purity is extremely high.

In 1965, the Chin-chou Electric Furnace Plant successfully trial manufactured an electronic bombarding furnace, which is only being manufactured by a few countries throughout the world. This furnace is capable of smelting difficult-to-melt metals and the purity of the products refined by this furnace is much higher than the products refined by other electric

furnaces. The fact that China can mass produce various types of vacuum metallurgy equipment is definitely an indication that she has attained a new level in her metallurgical techniques.

Successful Domestic Production of Quartz Glass

Among the noteworthy results of Chin-chou's newly developing industries is the successful domestic production of quartz glass.

Quartz glass is high grade material, heat-proof, pressure-proof and corrosion-proof, that can also be used as insulation material in the development of modern industry. The Chin-chou Quartz Glass Plant successfully smelted two types of quartz glass - transparent and opaque. This plant did not possess modern^{smelting} equipment but it designed an original "domestic furnace" and proceeded to smelt both transparent and opaque quartz glass. Presently, this plant is producing quartz glass plates and tubes of various sizes and shapes, and over 100 varieties of quartz glass measuring instruments. These products are being supplied in a steady stream to over 200 industrial plants^{scientific} and/research organizations throughout China.

These various quartz glass products are products which were banned for exportation to China by western capitalist countries. The Soviet Union^{reportedly} revoked her agreement to supply China certain types of urgently needed quartz glass products. Aroused to action by these conditions, the workers in Chin-chou exercised their spirit of self-effort to embark on the trial manufacture of these products. With the extremely limited data available at that time, the workers in Chin-chou realized that the quartz glass being manufactured in foreign countries employed the high frequency method and the glass fusion method using high frequency furnaces and oxyhydrogen processing equipment. It became clear to them that equipment of this nature

was not available in the plants in Chin-chou; that even if these equipment could be ordered, an extremely long interval would elapse between the time of order and the time of delivery. Accordingly, the workers planned their own design^{and} built a simple smelting furnace from abandoned materials collected from steel scrap piles/. They connected two borrowed electric welders together and ~~substituted~~ used them in place of transformers, poured salt water into a water tank and used it in place of a voltage regulator and, laborious after completing 115/tests over a period of 93 days in a make-shift workshop, they finally succeeded in trial manufacturing a 100 mm diameter quartz glass tube. From this unpretentious beginning, they reportedly perfected their own new method of processing quartz glass. Since this new processing method^{and} ~~simplifies~~ simplifies equipment manufacturing/ produces superior quality products than high frequency furnaces, and since product specifications are not restricted, this new processing method is reportedly being employed by the other plants in China where the high frequency method is not employable.

Heretofore, the scarce and valuable kryolite was being used to manufacture transparent quartz glass but the workers at the Chin-chou Quartz Glass Plant discovered a new raw material which is cheap and abundant in China. In comparing the quartz tubes made of kryolite with those made of this new raw material, there are no noticeable differences between them, and technical studies reportedly prove that they are practically identical in transparency and quality.

Early Development of Transistors

Manufacturing of transistors is a new technique that was developed throughout the world within the past 20 years. Chin-chou is one of the

~~various~~ first areas in China to engage in the development of the transistor industry. The two transistor parts plants in Chin-chou do not possess modern moisture-proof structures and workshops but they are producing 11 large, medium and small output transistors/~~according to~~ 40-odd specifications. ~~Various products for industrial and private use~~ / such as transistorized radios, listening devices/ and automatic control equipment are being produced and trial manufactured in Chin-chou at the present time.

One of these products - high frequency large output transistor - required the use of equipment such as KDKOKU ~~[phonetic]~~ [sic], vaporizers, heat rolling equipment, etc., which necessitated an investment of over 100,000 yuan and the construction of a new building. But female technician CHU Feng-ch'in, who was in charge of the trial manufacturing of this product, reportedly designed ~~designed~~ her own crude equipment and conducted test after test until she finally succeeded in trial manufacturing this highly technical high frequency large output transistor. Thereafter, at CHU Feng-ch'in's plant, this new product is reportedly being mass produced by a processing method unexplained in foreign data.

Establishment of the Synthetic Fiber (Nylon) Industry

Among the emerging industries in Chin-chou, the synthetic fiber industry is worthy of special mention. Chin-chou successfully trial manufactured a synthetic plasticizer and, using domestic raw materials and equipment manufactured through her own efforts, she successfully extracted nylon filaments.

22
In the summer of 1960, the Chin-chou Municipal Committee selected ~~various~~/workers from various plants and assigned them to the trial manufacturing of KAPURON [phonetic] (nylon filament). This trial manufacturing ~~process~~

process was apparently a trying process. An NCNA report described the process as follows:

" At that time, one group of specialists claimed that synthetic fibers could not be produced without a large modern plant and equipment. Even then, the process would require many years to perfect. But the plant organizers did not agree. They were only provided with a small trial manufacturing fund and an animal shed borrowed from the city's business interests. In order to allot their meager trial manufacturing funds to experimental needs, they did not expend funds for unproductive equipment. The animal shed served as their experimental laboratory, office and dormitory for the female workers. The male workers lived in tents outside the animal shed. They also ~~constructed~~ built a small room with dirt and rocks and converted it into a mess hall. In a modern synthetic fiber plant, the spinning section alone requires about three shops. In contrast, their animal shed was slightly over 5 meters ~~high~~ tall. Their plant consisted of ~~shelves~~ storage cans resting on shelves under the ceiling windows. When the wind blew in from the crevices around the ceiling window, they plugged these crevices with their blankets to maintain the temperature required for spinning within the shed. Conducting experiments under these trying conditions for a period of four months, they finally succeeded in spinning synthetic fiber filaments. With the coming of winter, a plain unfinished the city provided them with ~~an/unfinished~~ 3-story dormitory which will become a concrete building when completed."

Finally, by April 1961, after conducting a total of over 390 experiments during a trying period of 21 months, they overcame all technical difficulties and reached the stage whereby they were ready to provide the market with huge ~~quantities~~ quantities of their products. Today, their plant is a nylon

plant producing over 100 tons ~~of~~ annually.

Other Rare Earth Metals, Measuring Instruments, Etc.

Other noteworthy results attained by Chin-chou are the smelting of rare earth metals and the manufacturing of ruby for use as bearing material for measuring instruments and precision machinery.

Known rare earth metals number 17 at the present time but the majority of them are just beginning to be used throughout the world. These rare earth metals possess certain special/^{performance} characteristics that play a vital roles in the optical glass, metallurgy and atomic energy industries. The workers in Chin-chou groped their way through the myriad unknown factors existing in these newly developing industries and, currently, they are smelting various ~~metals~~ alloys such as rare earth aluminum, rare earth metallic silicon, and rare earth magnesium, and they are manufacturing products such as rare earth optical glass, and rare earth graphite steel. Investigations show that by casting the teeth of non-ferrous metal crushers with graphite steel reinforced with rare metals, their weight is reduced one-third and their life expectancy is prolonged more than 4-fold.

In the field of measuring instruments, Chin-chou manufactures ~~xxxviii~~ measuring microscopes ~~for~~ high precision ~~xxxviii~~ measuring instruments and a variety of high precision machinery, and produces navigation instruments such as sound signalling devices and induction devices, high temperature metallurgical measuring instruments, etc. The Ta-lu Instrument Plant in Chin-chou manufactured the "No Contact Point Remote Control Remote Communications Equipment" for the Ta-ch'ing Oil Field. This equipment is considered to be the latest development in Chinese scientific research. It enables one worker sitting at his desk to conduct eight operations including the

temperature control and
~~xxxxxx~~ operation of 10 oil wells.

The workers in Chin-chou have also successfully trial manufactured other vital products including the rubies being used as bearing material for precision machinery. China has been importing expensive diamond powder to use as the abrasive for polishing ruby tips but, an elderly Chin-chou worker has recently perfected an abrasive using agate powder, which is Chin-chou being produced extensively in the ~~Chin-chou~~/area.

Instead of using imported pyrex glass ~~(from the US)~~ (manufactured by the US), Chin-chou is successfully mass producing xenon ~~lamp~~ bulbs using ordinary native glass.